

REMARKS/ARGUMENTS

Restriction /Election

The Office previously considered claims 1-20 of the application to be directed to three patentably distinct inventions. Specifically, the Examiner required election of a single invention, wherein:

The first invention is drawn to a battery in which oxygen and a dendrite-forming metal form a redox pair, and wherein acidity of the electrolyte is provided at least in part by a compound that reduces dendrite formation during charging (Group I, claims 1-11);

The second invention is drawn to a battery with an acid electrolyte comprising methane sulfonic acid, and zinc and oxygen forming a redox pair (Group II, claims 12-15), and

The third invention is drawn to a battery comprising a static catholyte and a static acidic anolyte (Group III, claims 16-20).

The applicant disagrees. Nevertheless, the **applicant confirms prior telephonic election without traverse** of Group I, reading on **claims 1-11**. Claims 12-20 were withdrawn without prejudice.

35 USC §102

The Office rejected **claims 1-2 and 8** as being anticipated by Blurton et al (U.S. Pat. No. 4,220,690). The applicant agrees and amended claim 1 to more clearly differentiate over the cited art.

As amended, claim 1 expressly requires a **static** and acidic **electrolyte** in which **acidity is provided by an organic compound that reduces dendrite formation** during charging. These elements are neither taught nor suggested by Blurton. Therefore, the rejection of claims 1-2 and 8 should be overcome.

35 USC §103

The Office rejected **claims 3 and 9** as being obvious over Blurton in view of Armstrong (U.S. Pat. No. 4,066,823). The applicant respectfully disagrees for various reasons.

First, neither Blurton nor Armstrong teach or suggest all of the elements in the claims as pointed out above. Based on at least this defect, the rejection should be withdrawn. Second, it is noted that Blurton teaches away, if not even against the claimed subject matter as Blurton relies on a redox-flow battery in which electrolyte necessarily must be circulated, an element that is expressly disclaimed in the instant claims.

Still further, the examiner seems to argue that Armstrong would teach a battery in which oxygen and a dendrite forming metal would form a redox pair AND that in such batteries an organic acid (benzene sulfonic acid) would be provided. There is not support in Armstrong for such assertion. Yes, Armstrong does teach a battery in which oxygen and a dendrite forming metal form a redox pair, and in a *separate discussion of electrolytes of prior known batteries*, that various strong acids (including benzene sulfonic acid) are known as acid electrolyte. However, Armstrong clearly fails to provide the nexus between metal-air batteries and use of organic acids in an electrolyte of a zinc air battery. It should be noted that the vast majority of organic acids in secondary batteries is simply destroyed during the charge/discharge process, thus ruling out use of such acids in secondary batteries. Even more significantly, the claims also expressly require that the organic compound must not only provide acidity, but also reduce dendrite formation. Such is not the case of benzene sulfonic acid. Should the office deem this feature taught by Armstrong, official notice to that effect is respectfully requested.

The Office rejected **claims 4-5** as being obvious over Blurton in view of Armstrong as applied above and further view of Harada (U.S. Pat. No. 6,428,928). The applicant respectfully disagrees for various reasons.

First, and as pointed out above, neither Blurton nor Armstrong teach or suggest all of the elements in the claims as pointed out above. Based on at least this defect, the rejection should be withdrawn. Harada fails to remedy this defect.

With respect to Harada, it is noted that the '928 patent is concerned with solid polymer electrolytes (see *e.g.*, Figure 1, or column 4, lines 14-51) which are entirely inconsistent with a fluid electrolyte as presently claimed. Consequently, solubility of zinc and dendrite formation is entirely moot. Based on at least these reasons, the rejection of claims 4-5 should be withdrawn. Still further, the examiner argued (pointing to column 8, lines 48-55) that Harada would teach functional equivalency between benzene sulfonic acid and methane sulfonic acid or polyvinyl sulfonic acid. Such is simply not the case. That passage provides a list of examples for sulfonic acids, however, does not teach any equivalency, let alone with respect to use in a zinc-air battery to reduce dendrite formation.

The Office rejected **claim 6** as being obvious over Blurton et al. in view of Awano (JP 57-101359). The applicant again respectfully disagrees for various reasons.

Once more, neither Blurton nor Awano teach or suggest all of the elements in the claims as pointed out in applicant's arguments regarding the rejection of claims 1-2 and 8 above. Indeed, all Awano provides is the term "brightener" in the context of a zinc-bromine battery, which is a redox flow battery using bromine as an oxidant. Moreover, as the examiner recognizes in his remarks, it is the zinc brightener that reduces dendrite formation and not the organic compound that also provides acidity to the electrolyte. Thus, if anything, Awano teaches away from the claimed subject matter.

The Office rejected **claim 7** as being obvious over Blurton et al. in view of Awano as applied to the rejection of claim 6 and in further view of Popescu (U.S. Pat. No. 4,226,682). The applicant again respectfully disagrees for various reasons.

As above, it is pointed out that neither Blurton nor Awano teach or suggest all of the elements in the claims as pointed out in applicant's arguments regarding the rejection of claims 1-2 and 8 above. Popescu fails to remedy these defects. Popescu merely provides examples for zinc brighteners in the context of forming uniform and brilliant zinc layers in electroplating operations. Therefore, claim 7 should not be deemed obvious over the cited art.

The Office rejected **claims 10-11** as being obvious over Blurton et al. in view of Heinke (EP 644275). The applicant again respectfully disagrees.

As pointed out in applicant's arguments regarding the rejection of claims 1-2 and 8 above, Blurton fails to teach or suggest all of the elements in the claims. Heinke fails to remedy these defects. While Heinke does teach use of a Magneli phase material in the context of an electrode, it should be noted that Heinke's electrodes are configured as solid plates, which are impervious to flow of oxygen as required for a zinc air battery and would so render the claimed invention inoperable for the intended purpose. For at least these reasons, the rejection of claims 10 and 11 is improper and should be withdrawn.

Request For Allowance

Claims 1-11 are pending in this application and claims 12-20 remain withdrawn. The applicant requests allowance of all pending claims.

Respectfully submitted,
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